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54 **A coating material for medical care.**

57 A coating material for medical care having anti-bacterial action against pseudomonas aeruginosa, staphylococcus aureus, escherichia coli and fungus is disclosed.

Powdered zeolite, wherein one or the whole of metals contained in said zeolite is substituted by at least one kind of ion exchangeable metals selected from the group consisting of Ag, Cu and Zn, is coated onto the coating material made of silicone rubber etc or kneaded thereinto.

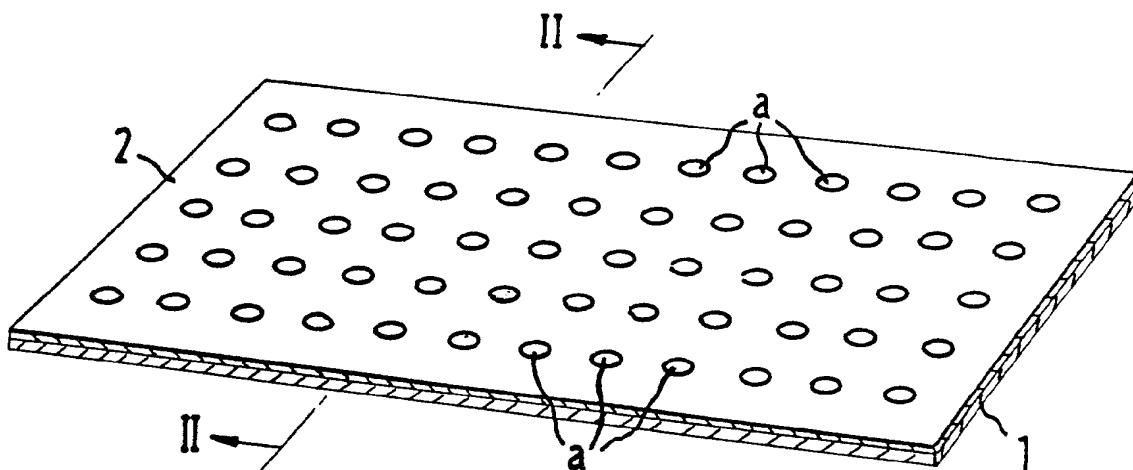


FIG.1

EP 0 298 726 A1

## A coating material for medical care

### FIELD OF THE INVENTION AND RELATED ART:

The present invention relates to a coating material for medical care ; and more particularly relates to an anti-bacterial coating material for medical care against pseudomonas aeruginosa etc for coating the affected part of the skin ascribable to burn etc.

Conventionally, a great variety of organometallic compounds or organic compounds were known as an anti-bacterial agent. However, said compounds have in general low melting points and also high volatility, thus rendering said compounds thermally unstable so as to cause early deterioration of the effectiveness thereof when those are employed in preparing a coating material for medical care having anti-bacterial action. Therefore, such compounds as above have not conventionally been employed as a coating material for medical care in view of such inconveniences as deteriorative effectiveness of anti-bacterial action, side effect, stimulant and short-period effectiveness etc.

### OBJECT AND SUMMARY OF THE INVENTION:

In order to provide a coating material for medical care for coating the affected part of the skin ascribable to burn etc having anti-bacterial action against pseudomonas aeruginosa or staphylococcus aureus etc which has the close relationship with burn etc, the inventor of the present patent application has found after years of study that anhydrous or crystallization water containing powdered anti-bacterial compound, wherein one or the whole of metals contained in zeolite is substituted by at least one kind of ion exchangeable metals selected from the group consisting of Ag,Cu and Zn, have anti-bacterial action against pseudomonas aeruginosa and staphylococcus aureus etc.

The aforementioned anti-bacterial compound was conventionally known as an anti-bacterial agent employed in the production of architectural products, e.g. disclosed in Japanese patent laid-open publication No. 181002/1985, but it was not clear that said anti-bacterial compound could be applicable to the field of medical care.

With the above in mind, it is an object of the present invention to provide a coating material for medical care having anti-bacterial action .

The aforementioned object of the present invention can be attained by providing a coating material for medical care comprising powdered zeolite, wherein one or the whole of metals con-

tained in said zeolite is substituted by at least one kind of ion exchangeable metals selected from the group consisting of Ag, Cu and Zn, being coated onto at least one side of the outer surfaces of the coating material made of silicone rubber in the form of a film or kneaded thereto.

The present invention was achieved by paying attention to the fact that the aforementioned compound acts as a long time anti-bacterial effect to moisture or water, and the gist thereof resides in that the coating material for medical care coated with the aforementioned anti-bacterial compound onto the outer surface thereof is applied to the wound ascribable to burn or said compound is kneaded into said coating material made of silicone rubber or the others ( hereinafter described in detail ) to constitute said coating material so as to apply the same to the burn from which secretion comes out.

Accordingly, said anti-bacterial compound continues to generate Ag ion, Cu ion and Zn ion for a long time when said compound comes in touch with the secretion and owing to the catalysis thereof anti-bacterial effect continues against pseudomonas aeruginosa, staphylococcus aureus, escherichia coli and fungus, for example.

Furthermore, said compound is thermally stable to the body heat and is safe as inorganic substance so that it is effective as a coating material for medical care.

### BRIEF DESCRIPTION OF THE DRAWINGS:

In the Figures ;

Fig. 1 to Fig. 3 show one embodiment according to the present invention, wherein the present invention is applied to a coating material for medical care.

Among said Figures, Fig. 1 is a perspective view of said coating material for medical care.

Fig. 2 is a sectional view taken along line 11-11 in Fig. 1, and

Fig. 3 is a sectional view of another embodiment of the present invention wherein the coating material according to the present invention is laminated in the form of sandwiches by employing at least two different or the same materials as the base thereof.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS:

Hereinafter, embodiments according to the present invention will be described in detail with reference to the drawings.

Fig. 1 is a coating material for medical care for coating the affected part of the skin ascribable such to as wound etc. In the drawing, (1) is a coating material and said coating material (1) is made of silicone rubber etc in the form of a film or net so as to easily coat the anti-bacterial compound according to the present invention thereonto. As illustrated in Fig. 2, onto both surfaces of said coating material or one side surface thereof, i.e. the surface directly applied to the affected part of the skin, said anti-bacterial compound is coated by means of conventional adhesives.

In Fig. 2, (2) is a coated layer with the anti-bacterial compound and (a) is a through hole and secretion generated from the affected part of the skin is discharged out of said hole (a).

Onto the outer surface of said coating material (1), the anti-bacterial compound is coated as illustrated in Fig. 2, but it is optional to prepare the coating material by kneading said compound into the solution for moulding said coating material in moulding the same so as to prepare the material itself.

Of course, said coating material may be prepared without forming the through hole(a) and the number and size of said hole may also be optional. Furthermore, said coating material may be prepared by kneading the aforementioned compound into synthetic resins, amino acid, collagen, chitin, natural leather, chemically synthesized or natural fiber as the base thereof in lieu of employing silicone rubber. Regarding the quantity of said anti-bacterial compound, it is optional and not particularly specified.

The aforementioned anti-bacterial compound is anhydrous or crystallization water containing one of single substance of natural or synthesized zeolite or the both, wherein one or the whole of the metals contained in said zeolite is substituted by at least one kind of ion exchangeable metals selected from the group consisting of Ag, Cu and Zn.

In stead of silicone rubber as the base of the coating material according to the present invention, it may employ amino acid, collagen, chitin, synthetic resins, natural leather, or natural or chemically synthesized fiber as the base thereof. The coating material may also be employed in the form of sandwiches by employing at least two different or the same kinds of the coating material as above described as illustrated in Fig. 3, wherein (1') is a coating material prepared, for example, by employing synthetic resins as the base thereof in

stead of silicone rubber laminated with the coating material(1) in the form of sandwiches and (2) is a coated layer of the anti-bacterial compounds and further (a) is a through hole.

As is clear from the above, since the coating material for medical care according to the present invention comprised anhydrous or crystallization containing powdered anti-bacterial compound as described above being coated onto at least one side surface of the outer surfaces of said coating material made of silicone rubber etc or kneaded thereinto in preparing the same, said compound exhibits strong anti-bacterial action against pseudomonas aeruginosa, staphylococcus aureus, escherichia coli and fungus without causing any inflammatory change of the skin when the coating material is applied to the affected part of the skin ascribable to burn etc.

Furthermore, since said anti-bacterial compound continues anti-bacterial effect for a long time when said compound comes in touch with secretion etc, it is not necessary to replace the coating material in use by the new one as often observed in employing a conventional coating material for medical care, thereby considerably reducing trouble ascribable thereto.

In employing silicone rubber and the like, it has such advantage as being able to employ the same repeatedly after washing even when a coating material for medical care thus prepared is contaminated by blood or secretion.

Furthermore, the anti-bacterial compound is thermally stable to the body heat and also have no toxicity so as to employ the same safely.

Thus, the present invention can provide an effective and safe coating material for medical care having anti-bacterial action as described above.

## Claims

1. A coating material for medical care comprising powdered zeolite, wherein one or the whole of metals contained in said zeolite is substituted by at least one kind of ion exchangeable metals selected from the group consisting of Ag, Cu and Zn, being coated onto at least one side of the outer surfaces of the coating material(1) made of silicone rubber in the form of a film or kneaded thereinto.

2. The coating material for medical care according to claim 1, wherein said coating material comprises amino acid, collage, chitin, synthetic resins, natural leather, natural or chemically synthesized fiber as the base thereof.

3. The coating material for medical care according to claim 1 or 2, wherein said coating material is made in the form of a net.

4. The coating material for medical care according to claim 1 or 2, wherein said coating material is formed to have a plurality of through holes (2,2') so as to easily discharge secretion therefrom.

5. The coating material for medical care according to claim 1, 2,3 or 4, wherein said coating material is constituted in a manner to form a laminated one in the form of sandwiches by employing at least two different or the same kinds materials as the base thereof.

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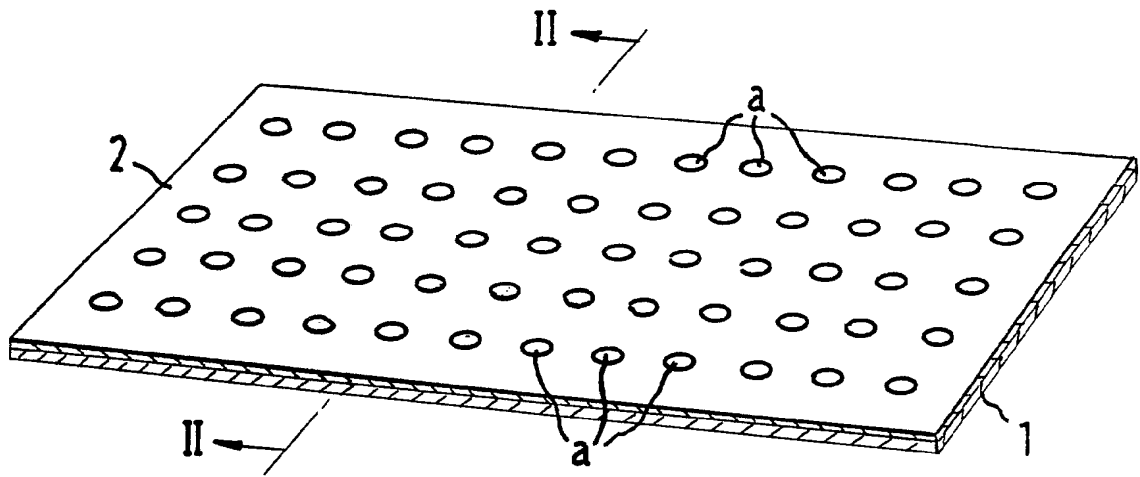


FIG. 1

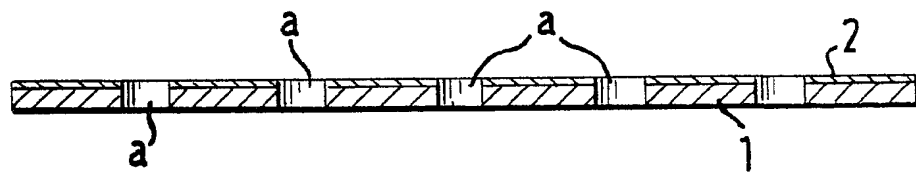


FIG. 2

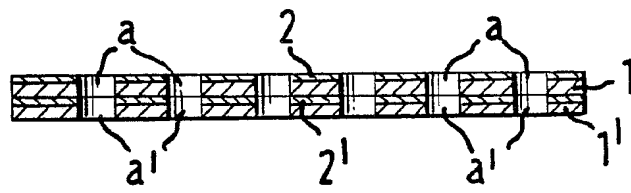


FIG. 3



European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number

EP 88 30 6164

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	PATENT ABSTRACTS OF JAPAN, vol. 10, no. 335 (C-384)[2391], 13th November 1986, page 42 C 384; & JP-A-61 138 658 (KANEBO LTD) 26-06-1986 * Abstract * ---	1	A 61 L 15/03
D,Y	PATENT ABSTRACTS OF JAPAN, vol. 10, no. 28 (C-326)[2085], 4th February 1986; & JP-A-60 181 002 (KANEBO K.K.) 14-09-1985 * Abstract * ---	1-5	
Y	PATENT ABSTRACTS OF JAPAN, vol. 10, no. 350 (C-387)[2406], 26th November 1986, page 86 C 387; & JP-A-61 151 131 (LION CORP.) 09-07-1986 * Abstract * ---	1-5	
P,Y	PATENT ABSTRACTS OF JAPAN, vol. 12, no. 47 (C-475)[2894], 12th February 1988, page 109 C 475; & JP-A-62 195 037 (KANEBO LTD) 27-08-1987 * Abstract * ---	1-5	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	PATENT ABSTRACTS OF JAPAN, vol. 10, no. 17 (C-324)[2074], 23rd January 1986, page 159 C 324; & JP-A-60 174 707 (KANEBO K.K.) 09-09-1985 * Abstract * ---		A 61 L
A	PATENT ABSTRACTS OF JAPAN, vol. 10, no. 23 (C-325)[2080], 26th January 1986, page 163 C 325; & JP -A-60 178 810 (KANEBO K.K.) 12-09-1985 * Abstract * -----		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29-09-1988	Examiner ESPINOSA Y CARRETERO M.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document			